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VEGETATIVE GROWTH, FLOWERING AND YIELD OF FLORIDA PRINCE PEACH TREES AS INFLUENCED BY DIFFERENT WINTER PRUNING TIMES

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ABSTRACT: This investigation was carried out during two successive seasons of 2021/2022 and 2022/2023 on peach (*Prunus persica*) trees 'Florida Prince'cv. Grafted on Nemagard rootstock to study the effect of different winter pruning times on vegetative, flowering, yield, growth measurements and leaves elements chemical analysis. Trees were grown under sandy soil conditions at distances (4×5m) in apart under drip irrigation in private orchard in Monufia Governorate, Egypt. five treatments were applied five times during winter pruning, on the mid- October (T1), was the first of November (T2), mid-November as a control trees (T3) first of December(T4), and mid- December (T5). Results indicated that pruning on first December followed by mid- December and pruning in October reduced the shoot length, width and height of the crown, also mid- October and first November pruning decreased the number of flowers. It could be recommend to prune Florda Prince peach trees in the first week of December (late pruning) to improve growth and yield which was superior over other dates and increase yield for local consumption and fruits exporting.

Key words: Florida Prince, winter pruning, yield, floral aspects, bud behavior and vegetative growth.

INTRODUCTION

The peach (*Prunus persica*) is consider one of the most important deciduous fruit that shows great success and is widespread in the newly reclaimed areas in Egypt in the last decade. It's the most popular stone fruits in the world because of its high nutrient level and pleasant flavor. Peach fruit are enriched with ascorbic acid, carotenoids (provitamin A), phenolic compounds and are considered prime sources for antioxidants **(Tomas-Barberan *et al*., 2001; Byrne, 2002).** In Egypt, the cultivated area with peach reached 38138 feddans out of them 29264 feddans are fruitful producing about 272592 tons with an average of 9.31 ton/fed. **(FAO Statistics, 2022).**

Pruning is an important orchard practice because pruning can improve fruit quality and the balance between vegetative growth and fruit number. Fruit trees are pruned to improve fruit quality by encouraging an appropriate balance between vegetative (wood) and reproductive (fruiting) growth. Annual pruning of fruit trees always reduces yield, but enhances fruit quality **(Mika, 2011)**.

Fruit trees are pruned to restrict tree size, control tree shape, maintain balance between vegetative and reproductive growth, to improve fruit size and fruit production to obtain a high yield of quality fruit each year. Typically, pruning takes place when the tree is dormant.

For commercial fruit growing, the natural form and shape of the fruit tree has to be

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modified in a specific manner, so that they perform better for a longer period through the practice of pruning to achieve the target of high production of good fruit quality. Since unwanted portions of plants may develop at the expense of those which are essential from the cultivator's point of view. The pruning techniques have to be, therefore, standardized in terms of amount and severity, keeping in view the fruit bud formation/fruiting behavior of the plant (**Kumar *et al*., 2010).**

As winter pruning plays the most important role in restricting the canopy growth of the trees and improving fruit quality **(Hampson *et al*, 2002).**

Peach "Florida prince" cv. is an early ripening variety under local environmental conditions. Florida Prince is one of the first commercial peach varieties produced for subtropics (low chilling requirement) areas, where it needs about 150 hours less than 7°C to break bud dormancy **(Rouse *et al*., 2006)**. Recently, irregularities have been observed in both vegetative and floral buds, where the floral buds burst. It occurs before vegetation due to the lower cooling requirements of the former. Therefore, the current work was designed to evaluate the effectiveness of pruning timing and its effect on vegetative and flower buds as well as on the yield and fruit characteristics Florida Prince peach trees.

This study has been mainly conducted on the impact of different times of winter pruning on vegetative growth, flowering and total yield.

MATERIALS AND METHODS

An experiment was conducted on 5 years old peach trees of Florda Prince cv. grafted on the Nemagard rootstock during two seasons (2021/ 2022 and 2022/2023). Trees were grown in the private orchard at the Khatatbah district, Al Sadat city, Monufia Governorate, Egypt. Five winter pruning process had been done on different dates as following: in the 15th of October (T1), the 1st of November (T2), 15th of November was control trees (T3) 1st of December (T4), and 15th of December (T5). Trees planted in a sandy soil at 4*5 m apart, nearly similar in growth, vigor, tree from any visual infections and received regularly the recommended practices under drip irrigation. The experiment was designed system in a randomized complete blocks design in three replicates for each treatment. The treatments are five pruning dates by three replicates (two tree/ replicate) and the total number were thirty trees.

Eighty-five one-year old shoots for tree were chooses and the other shoots were removed. These one-year old shoots were heading back cut. Heading back was 25% from the shoot length. The length of the shoot was 60 cm.

According to the recommendations of the Ministry of Agriculture in Egypt with other cultural practices for sandy soil conditions, Each tree was fertilized with 350 g N, 50 g P_2O_5 and 400 g K_2O/year according to the recommendations of Ministry of Agriculture. The trees were sprayed with hydrogen cyanamide at 0.75% (the product Dormex SKW Torstborg 49% hydrogen cyanamide) in 10 November, and 14 November, for both seasons respectively. Tables 1 and 2 show the soil and water analysis (In Agro labe Al-Sadat).

During the two seasons of the study, the following parameters were measured:

Bud Behavior

Numbers of floral and vegetative buds opening were counted and percentage of each type was calculated in relation to the total number of buds on every labeled shoot. Buds were identified morphologically by the shape of the bud apex. Flower buds were concave from the bud apex, while vegetative buds were pointed from the bud apex. The percentage of floral, vegetative and dormant buds were calculated according to the following equations:

$$\text{Floral buds \%} = \frac{\text{Number of floral buds}}{\text{Total number of buds}} \times 100$$

$$\text{Vegetative buds\%} = \frac{\text{Number of vegetative buds}}{\text{Total number of buds}} \times 100$$

$$\text{Dormant buds\%} = \frac{\text{Number of dormant buds}}{\text{Total number of buds}} \times 100$$

Table 1. Soil physical properties of the experimental site

Soil depth cm	0 - 30	30 - 60	60 – 90
Soil properties		**Values**	
Sand (%)	62.28	63.32	63.53
Clay (%)	14.75	15.07	15.29
Silt (%)	22.97	21.61	21.18
Soil texture		Sand	
pH	7.35	7.40	7.43
EC (dS/m)	2.64	2.64	2.65
Organic matter (%)	0.56	0.58	0.46
Available P (ppm)	7.10	9.7 0	8.60
Available K (ppm)	187.5	166.5	146.5
Available Ca (meq/l)	9.00	9.15	9.21
Available Mg (meq/l)	4.00	4.11	3.99
Available Na (meq/l)	14.50	14.00	15.00
HCO_3 (meq/l)	7.75	8.85	9.00
Cl (meq/l)	9.57	10.77	11.00
SO_4 (meq/l)	19.00	21.40	18.88

Table 2. Chemical properties of irrigation water

pH	EC dS/m	TDS	Soluble salts (meq/I)								SAR
			Ca^{++}	Mg^{++}	Na^{+}	K^{+}	CO_3^{-}	HCO_3^{-}	Cl^{-}	SO_4^{-}	PPm
7.12	**1.5**	**10**	6.0	3.6	21.95	0.23	0.1	3.0	14	14.7	960

Total Yield Per Tree And Per Feddan

In the maturity stage (during the 2nd week of April), the average number of fruits per tree was counted. The yield tree (kg) was calculated by multiplying the average number of fruits/tree and average weight of fruits of each replicate as Wills yield/feddan (Ton) was calculated multiplying the average yield/tree (kg) and number of trees /feddan.

Vegetative Growth Measurements

Eight branches as similar as possible were chosen at the four cardinal points of each treated tree were tagged and the average measurements were taken of:

Trunk girth increasing rate (cm)

At first and the end of the growing season, it was measured at a fixed point 5 cm above the graft union zoon by Cloth Tape Measure Operating Instruction (DCOI), was calculated according to the following equation:

Trunk girth increasing rate (cm)= final trunk diameter at the end of the growing season - initial trunk diameter at the first of the growing season.

Shoot diameter (mm)

It was measured at a fixed point 5 cm above the shoot base by a Digital Caliper within 300 mm Operating Instruction (D.C.O.I) at the end of the growing season.

Shoot length (cm)

Eight branches as similar as possible were chosen at the four cardinal points of each treated tree were tagged and the average of shoot length (cm) by Cloth Tape Measure Operating Instruction (D.C.O.I) at the end of the growing season.

Number of new shoots/tree

The total number of shoots per tree was counted at the end of the growing season.

Leaf area (cm^2)

Using leaf area apparatus (C1-203 Area Meter CID, Ime) leaf area (cm^2) was determined by ten matured leaves collected at random from each studied tree.

Leaf number/shoot

Eight branches as similar as possible were chosen at the four cardinal points of each treated tree were tagged and leaves number per shoot was measured.

Average length of internode (cm)

It was measured by a Digital Caliper within 300 mm Operating Instruction at the end of the growing season (With a graduated ruler).

Moisture content in the leaves

Moisture content of leaves:

Leaves samples at mid-June were washed by distilled water then dried. And a fixed sample of 20 g of leaves was weighed from each treatment and then dried in an oven at 70°C until the weight was constant. The moisture content of the leaves was calculated using the following equation:

The moisture content of leaves = weight of fresh sample - weight of dry sample ÷ Wight of fresh sample × 100

Leaf Chemical Constituents (%)

Leaves were collected in the 2nd week of July in each season then dried and ground samples were digested according to the method of **Jackson (1958)**, the determinations of various minerals were as follows:

Total carbohydrates (%)

It was calculated as mg per 100 mg dry weight and determined according to **Smith *et al.* (1956)**.

C/N ratio

It was calculated from the previous values of total carbohydrate and total nitrogen.

Leaf mineral contents

Mineral nutrient determinations were determined according to **Kitson and Mellon (1964)**:

Total nitrogen (mg/100g)

It was determined in samples of 0.5 g dried material by the modified micro-Kjeldahl method mentioned by **Pregel (1945)**.

Total nitrogen (N)

Was calorimetrically determined according to the methods described by **Naguib (1969)**.

Phosphorus percentage (%)

It was estimated by colorimetric method described by **Kitson and Mellon (1964)**.

Potassium percentage (%)

It was estimated by a flame photometer model EEL according to **Brown and Lilleland (1964)**.

Leaf total chlorophyll content (sppn)

Was determined in a sample of a mature leaf by spad 502 plus Chlorophyll meter.

Statistical Analysis

The obtained data from both seasons were subjected to analysis of variance (ANOVA) using the Costat Computer Software program, according to **Snedecor and Cochran (1980)**. The treatment means were compared by using Duncan's multiple range test at a probability of 0.05 according to **Duncan (1958)**.

RSULT AND DISSCUSION

Effect of Winter Pruning Dates on Bud Behavior (Total Buds/ Branch, Floral Buds, Vegetative Buds and Dormant Buds Percentages)

The data in Table 3 demonstrated how the timing of pruning affected on bud behavior as floral, vegetative and dormant buds, total buds/ branch. The timing of pruning had no significant differences on total buds/ branch in both seasons. Also, over both seasons trees that were pruned in the first week (T4) and the second week (middle) (T5) of December provided a noticeably greater proportion of floral bud's percentage in the two season as opposed to the treatments to those pruned in mid-October and the first week of November, and there was also no significant difference of the floral buds percentage between T4 and T5 with the control treatment in mid-November in the first season. The tress pruned in mid-October and the first week of November date produced fewer floral buds.

Respect the effect of pruning time on the percentage of vegetative buds was shown data in Table 1 the highest rate of vegetative buds was found with pruning mid-October in both seasons.

The data indicated that trees pruned in mid-October (T1) and at the first week of November (T2) produced a higher percentage of dormant buds than those pruned in the 1st and the second week of December in the two seasons, and without significant differences with the trees pruned in mid-November (control) in the first season.

These results are consistent with **Ikinci (1999), Kumar *et al.* (2005) and Singh *et al.* (2012)**. **Ikinci (1999)** which they found that, trees pruned in May and August flowered earlier in general flowering on trees was delayed by winter and summer pruning applied on apricot, peach and almond trees. **Singh *et al.* (2012)** noticed that trees of cuftivar pruned on 30 October with 50% severity produced flowers in between 16 to 25 January, whereas flowering period ranged from 9 to 12 days irrespective of different treatment. By the way flowering and fruiting was earlier by 15 days and fruit size and yield was recorded maximum rate with 50% shoot retention compared to trees pruned in 30 November. **Kumar *et al.* (2005)** found that the three pruning treatments stimulated early flowering and enhanced the quantity of flowers and fruit set on the Sharbati, Flordasun, and Prabhat peach cvs.

Effect of Winter Pruning Dates on Total Yield Per Tree and Per Feddan

The results shown in Table 4 demonstrated the noteworthy impact of implementing winter pruning dates at varying times. When it came to fruit weight, quantity of fruits on the tree, tree production, and productivity per feddan, the treatment that was pruned on December 1st (T4) performed better than the other treatments during the first and second seasons for Number of Yield/tree (Kg) and Yield/Fed (Ton.). Additionally, trees pruned during the 1st and December 15th treatments yielded a greater yield per tree than trees pruned during the first season.

These results are in line with those reported by **Sosna (2010)**, who mentioned that the pruning time had influence on mean fruit weight and fruits picked from dormant pruning trees were significantly heavier with summer pruning ones, **Banados *et al.* (2009)**, who suggested that pruning techniques affected fruit weight. The data presented is consistent with the findings of **Zayan (1991)**, who found that peach fruits and yield were larger when pruning was done during dormancy. While **Gill and Ball (2006) and Singh *et al.* (2012)** reported, increase in fruit size and weight might be attributed to better source-sink relationship and lesser competition for assimilates among the fruits in pruned trees and the increase in the number and area of leaves increases the amount of photosynthates that cause a significant increase in the size and weight of fruit in the winter.

Effect of Winter Pruning Dates on Vegetative Growth

As shown in Table 5, trunk girth (cm), shoot diameter (cm), shoot length (cm), and number of new shoots and number of internodes/meter were significantly affected by the tested treatments during the two studied seasons. Tabulated data demonstrate that the pruning at the first of

Table 3. Effect of winter pruning dates on bud behavior (Total buds/branch floral, vegetative and dormant buds percentages of Florida Prince cv. peach (2021/2022 and 2022/ 2023 seasons)

Characters / Winter pruning dates	Bud behavior			
	Total buds/ branch	Floral buds (%)	Vegetative buds (%)	Dormant buds (%)
2021/ 2022 seasons				
T1- Middle of October	55.25a	33.97c	48.76a	18.72a
T2- First of November	55.92a	38.44b	44.55b	17.27ab
T3- middle of November (control)	54.25a	39.49ab	42.85b	17.20ab
T4- First of December	53.82ab	44.01a	40.14c	14.44b
T5- Middle of December	53.78ab	43.66a	40.19c	14.39b
2022/ 2023 seasons				
T1- Middle of October	56.57 a	33.19 c	50.56a	18.81a
T2- First of November	56.65 a	34.1 c	44.59b	18.01ab
T3- Middle of November (control)	56.42 a	39.44 b	44,57b	17.60b
T4- First of December	56.75 a	43.41a	43.13c	15.20c
T5- Middle of December	56.25 a	43.37a	43.15 c	15.11 c

Different letters indicate significant differences ($p \leq 0.05$) using Duncan's Multiple Range Test.

Table 4. Effect of winter pruning dates on total yield per tree and per feddan of "Florda Prince" cv. peach (2021/ 2022, and 2022/ 2023 seasons)

Winter pruning dates / Characters	Yield/tree (Kg)	Yield/Fed. (Ton.)
2021/ 2022 seasons		
T1- middle of October	23.76 d	4.99 d
T2- first of November	26.36 c	5.53 c
T3- middle of November (control)	30.63 b	6.43 b
T4- first of December	34.35 a	7.21 a
T5- middle of December	32.87 a	6.90 a
2022/ 2023 seasons		
T1- middle of October	27.41 e	5.76 e
T2- first of November	31.33 d	6.58 d
T3- middle of November (control)	33.81 c	7.10 c
T4- first of December	44.36 a	9.31 a
T5- middle of December	38.44 b	8.07 b

Different letters indicate significant differences ($p \leq 0.05$) using Duncan's Multiple Range Test.

Table 5. Effect of winter pruning dates on some vegetative growth characteristics of "Florda Prince" cv. peach trees (2021/ 2022, and 2022/ 2023 seasons)

Character / Winter pruning dates	Trunk girth (cm)	Shoot diameter (cm)	Shoot length (cm)	No. of new shoots	The number of internode /meter
2021/ 2022 seasons					
T1- middle of October	32.33 b	0.529 c	50.16 d	97.00 b	44.33 a
T2- first of November	33.66 ab	0.554 bc	51.66 c	101.00 ab	40.33 b
T3- middle of November (control)	34.66 a	0.573 b	53.08 b	104.00 a	37.66 bc
T4- first of December	35.33 a	0.630 a	56.91 a	106.00 a	35.66 c
T5- middle of December	35.33 a	0.587 b	53.83 b	106.00 a	37 c
2022/ 2023 seasons					
T1- middle of October	33.00 e	.538 b	42.66 c	109.00 d	30.33 a
T2- first of November	34.33 d	.554 b	44.33 c	114.00 c	28.00 b
T3- middle of November (control)	36.00c	.562 b	49.00 b	115.00 bc	25.00 c
T4- first of December	40.00 a	.639 a	54.83 a	120.00 a	19.00 e
T5- middle of December	38.66 b	.607 a	51.58 b	119.00 ab	21.66

Different letters indicate significant differences ($p \leq 0.05$) using Duncan's Multiple Range Test.

December (T4) had the highest values of trunk girth (cm), shoot diameter (cm), shoot length (cm), and number of new shoots, in both studied seasons. T2, T3, T4 and T5 recorded highest significant values of Trunk girth (cm) and number of new shoots without differences between them compared with T1 in the first season only. The trees were pruned in mid-October gave least values of trunk girth (cm), shoot diameter (cm), shoot length, and number of new shoots, in the two seasons. As well as, the trees pruned at mid-December (T5) had higher shoot diameter (cm) and number of new shoots in the second season. The trees pruned in mid-October gained highest number of internode /meter (44.33 and 30.33/m) compared with other different dates in both seasons, respectively.

Table 6 illustrates that, tree height (m), Tree canopy (cm), leaf moisture content and Leaf area (cm^2) were significantly affected by the winter pruning dates in the both studied seasons.

The trees pruned in mid- November (T3), first of December (T4) and mid- December (T5) gained uppermost values (2.65 and 2.64, 2.83 and 2.99, 2.71 and 2.65 m) of tree height (m) in the first and second season, respectively, without differences between them and also with the trees pruned in first of November (T2) (2.72 m) in the second season only. The trees pruned in mid- October were shortest trees (2.45 and 2.43 m) in the both seasons, respectively.

The largest tree canopy was for trees were pruned in first of December (T4) (6.43 and 6.49 m) in the first and second season, respectively. The smallest tree canopy was for trees were pruned in mid-October (T1) (4.85 and 5.09 m) in the two seasons, respectively. The other winter pruning dates recorded values in-between.

The treatments T1 and T2 recoded highest leaf moisture content but T4 and T5 had the lowest values across the two seasons.

All winter pruning dates had the highest leaf area (cm^2) except the date of mid-October (T1) in both seasons.

Trunk cross sectional area (TCSA) increment recorded the highest by dormant pruning of peach trees **(Platon and Zagrai, 1997)**. This is

Table 6. Effect of winter pruning dates on tree height, canopy, leaf moisture content and leaf area of "Florda Prince" cv. peach (2021/ 2022, and 2022/ 2023 seasons)

Characters / Winter pruning dates	Tree height (m)	Tree canopy (m)	Leaf moisture content%	Leaf area (cm^2)
2021/ 2022 seasons				
T1:middle of October	2.45 c	4.85 c	49.95 a	32.06 b
T2: first of November	2.56 bc	5.26 bc	44.65 ab	33.72 ab
T3:middleof November (control)	2.65 ab	5.51 bc	40.55 b	34.16 ab
T4: first of December	2.83 a	6.43 a	30.03 c	34.85 a
T5:middleof December	2.71 ab	5.91 b	25.05c	34.59 ab
2022/ 2023 seasons				
T1: middle of October	2.43 b	5.09 d	49.15a	32.06 b
T2: first of November	2.72 ab	5.15 d	42.15 ab	33.72 ab
T3: middle of November (control)	2.64 ab	5.62 c	38.15 b	34.16 ab
T4: first of December	2.99 a	6.49 a	24.15 c	34.64 a
T5: middle of December	2.65 ab	6.03 b	28.9 c	35.03 a

Different letters indicate significant differences ($p \leq 0.05$) using Duncan's Multiple Range Test.

consistent with what mentioned by **Demitras *et al.* (2010**) who found that the effect of different pruning applications on shoot diameter, length and leaf area were statistically significant. **Ikinci (1999)** also found that the shoot length and diameter were affected by the pruning treatments in two years. Latent defoliation reduces the foliage area at the beginning of the growing season and bud breakage and removal of newly expanded leaves and reduced foliage area out by the heavy sleeper head grow buds strongly. by the heavy sleeper had grown buds strongly. By the way, Late pruning enhanced strong shoot growth, which in turn increased the number of leaves per shoot and the leaf area during the pruning period due to the alteration of apical dominance.

Effect of Winter Pruning Dates Treatments on N, P and K (%), Total Carbohydrate (%), C/N Ratio and Total Chlorophyll of Leaves

It is clear from Table 7 that, the maximum percentage of nitrogen was recorded from leaves of trees pruned in mid- October (2.543 and 2.73%) during both studied seasons, and also trees pruned in first November (2.215%), and mid-November (2.215%) in the first season. Then, the treatment of pruning indicated that percentage of nitrogen maybe declines with late time of pruning.

The leaves of trees pruned in first of December had highest phosphorus (0.353%) and potassium (3.84%) contents compared to other treatments in the first season, while in the second season, all treatments of pruning recorded non-significant values of P (%) and K (%) contents. In addition, the leaves of trees pruned in mid- December recorded high P (0.343%) percentage in the first season.

These results are consistent with **Cheng and Raba (2009)**. Since nitrogen is mobile, its translocation to the leaves could have aided its accumulation in the apple leaves. The findings of **Fathi and Mokhtar (1998) and Zayan *et al.* (2002)** on apples, which indicated that increasing the severity of dormant pruning increased leaf in total phosphorus content and total potassium content.

As shown in Table 8, the total carbohydrate content was increased in the leaves of trees pruned in the first of December and mid- December

Table 7. Effect of winter pruning dates on N, P and K (%) of leaves "Florda Prince" cv. peach (2021/ 2022, and 2022/ 2023 seasons)

Characters Winter pruning dates	N (%)	P (%)	K (%)
2021/ 2022 seasons			
T1: middle of October	2.543 a	0.283 c	2.81 e
T2: first of November	2.215 ab	0.293 c	2.93 d
T3: middle of November (control)	2.215 ab	0.313 b	3.35 c
T4: first of December	1.916 b	0.353 a	3.84 a
T5: middle of December	1.915 b	0.343.a	3.47 b
2022/ 2023 seasons			
T1: middle of October	2.73 a	0.117 a	2.13 a
T2: first of November	2.35 b	0.227 a	2.52 a
T3: middle of November (control)	2.29 bc	0.238 a	2.53 a
T4: first of December	1.98 d	0.220 a	2.47 a
T5: middle of December	2.12 cd	0.240 a	2.37 a

Different letters indicate significant differences ($p \leq 0.05$) using Duncan's Multiple Range Test.

Table 8. Effect of winter pruning dates on carbohydrate (%), C/N ratio and total chlorophyll of "Florda Prince" cv. peach leaves (2021/ 2022, and 2022/ 2023 seasons)

Characters Winter pruning dates	Total carbohydrate (%)	C/N ratio	Total Chlorophyll (sppn)
2021/ 2022 seasons			
T1- middle of October	29.25 c	11.50 c	38.56 d
T2- first of November	30.04 bc	13.56 bc	39.78 cd
T3- middle of November (control)	31.34 bc	14.14 b	41.26 bc
T4- first of December	34.65 a	18.1 a	43.10 a
T5- middle of December	32.08 ab	16.75 a	42.39 ab
2022/ 2023 seasons			
T1- middle of October	29.24 c	10.71 c	49.22 d
T2- first of November	31.33 bc	13.22 b	41.21 c
T3-middle of November (control)	32.05 ab	13.99 b	41.75 bc
T4- first of December	32.84 ab	16.59 a	43.23 a
T5- middle of December	34.72 a	16.37 a	42.71 ab

Different letters indicate significant differences ($p \leq 0.05$) using Duncan's Multiple Range Test.

(34.65 and 32.84 ; 32.08 and 34.72%) in the first and second season, respectively, without significant differences between them and with mid- November (control) (32.05%) in the second season. Statistical analysis indicated that, the C/N ratio gained the same trend of total carbohydrate content in the two seasons. In this sense, the C/N ratio was most significantly impacted by the trimming that occurred in the first of December and mid-December (18.1 & 16.1 and 16.75 & 16.37) for the first and second seasons, respectively.

It is observed from Table 8, the leaves of trees pruned in the first of December and mid - December recorded highest total chlorophyll (43.10 & 43.23 and 42.39 & 42.71) in the first and second season, respectively, while the leaves of trees pruned in mid- October recorded lowest total chlorophyll (38.56 and 49.22) in the both seasons. The other winter pruning dates recorded values of total chlorophyll in-between.

These findings corroborated those of **Gabr and Ibrahim (2005)**, who found that all pruning techniques considerably raised the total carbohydrate content of the leaves on "Florda Prince" peach plants. These findings align with the study that mentioned **Kuden and So (2000)** mentioned on carbohydrate content in annual shoots on the carbohydrate contents of annual shoots and leaves of young 'Precoce de Tyrinthe' apricot trees which was highest in the control trees during the first year while, the summer + winter pruning gave the highest values in the second-year total sugar and sucrose contents of the leaves was greatest following winter pruning.

These findings are consistent with research by **Kaundal *et al*. (1997)**, which found that trimming of peach trees on December 31 produced the highest C/N ratio. Mohamed et al. (2006) also observed that varied heading back cut levels considerably enhanced the C/N ratio in the spurs and buds of trimmed trees in apricot. Also, **Abd Elwahab *et al*. (2002)** found that, Summer pruning and pp333 considerably raised the C/N ratio in the spurs of all treated apple trees.

Conclusion

These results indicated that during the two experimental seasons, the pruning time in the first December was the best where it was had a clear effect in improving the vegetative parameters of the trees, as well as the yield. In light of the obtained results under the experimental, it could be recommended that pruning Florda Prince peach trees in the first week of December (late pruning) improve the growth and yield which where superior over other dates and increase yield for local consumption and exporting.

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النمو الخضري، والإزهار، وإنتاجية أشجار الخوخ صنف فلوردا برنس تحت تأثير مواعيد مختلفة للتقليم الشتوي

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تم إجراء هذا البحث خلال موسمين متتاليين 2022/2021 و2023/2022 على أشجار الخوخ صنف فلوردا برنس (*Prunus persica*) المطعومة على أصل النيماجارد عمر 5 سنوات و ناميه فى تربة رملية على مسافة 4 × 5 م تحت نظام الرى بالتنقيط فى مزرعة خاصة بمحافظه المنوفية . تم اجراء المعاملات أربع مرات خلال التقليم الشتوي، المرة الأولى كانت في منتصف أكتوبر (T1)، والثانية كانت أول نوفمبر (T2)، والثالثة منتصف نوفمبر كأشجار كنترول (T3)، والرابعة أول ديسمبر (T4)، والخامسة منتصف ديسمبر (T5). أشارت النتائج إلى أن التقليم في أول ديسمبر ثم منتصف ديسمبر والتقليم في أكتوبر تسبب تقليل طول الافرخ وعرض وارتفاع قمة الشجرة. كما أدى التقليم في منتصف أكتوبر وأول نوفمبر الى تقليل عدد الأزهار. يمكن أن يوصى بتقليم أشجار الخوخ فلوردا برنس في الأسبوع الأول من شهر ديسمبر (تقليم متأخر) على الشجرة لتحسين النمو والإنتاجية حيث تفوق على غيره من المواعيد و زاد من المحصول للاستهلاك المحلي والتصدير تحت ظروف هذه الدراسة .

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